

The Maritime Earwig in California

(Dermaptera: Carcinophoridae)

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During an extensive survey of earwigs in California, particular emphasis was focused on the maritime or seaside earwig, *Anisolabis maritima* (Géné). My special interest was due to the lack of material in most California museums, and to the rather narrow ecological habitat of this species.

Based on the classification of Popham (1965), the placement of *Anisolabis* is in the subfamily Carcinophorinae under the Labiodea. Within California, this is the only species of the genus found under natural conditions. It is morphologically distinct, and is rarely confused with any other earwig occurring in the state.

A condensed synonymy is given below to indicate only the original references for each generic change, combined with the first records for the United States and also California.

ANISOLABIS MARITIMA (Géné)

Forficula maritima Géné, 1832, Sagg. Monogr. Forfic. Indig., p. 9. [Nice, France; Genoa and Tuscany, Italy; along Mediterranean.]

Forficula (Labidura) maritima, Fischer, 1853, Orth. Eur., p. 68, pl. 6, figs. 4, 4a-d.

Forficesila maritima, Serville, 1853, Ins. Orth., p. 27.

Anisolabis maritima, Fieber, 1853, Lotos, III, p. 257. [South Carolina.] (Generic assignment and first United States record.)

Brachylabis maritima, Dohrn, 1864, Stettin. Ent. Zeit. 25, p. 293.

Anisolabis maritima, Essig, 1922, Pomona College Jour. Ent. & Zool., p. 75. [Laguna Beach, California.] (First California record.)

DIAGNOSTIC FEATURES AND LIFE HISTORY

The adult maritime or seaside earwig measures 20–32 mm including forceps. It is wingless, with the body shiny black, or sometimes very dark brown. The uniformly dark colored antennae vary from 20 to 24 segments in the adults, with a lesser number in the juveniles. (One to several lighter segments are diagnostic for some other species of earwigs.) The legs are pale yellow (dark banding on the legs is characteristic of a smaller, closely related species commonly found in California). The forceps of the male are curved or sickle-shaped, and asymmetrical, the right being shorter. The forceps of the female are basally parallel, becoming curved slightly inward near the tips.

The immatures have the body shape, color and straight forceps of the mature females, but juveniles can be differentiated by the number of segments in the antennae; the number increases with each successive stage. Preserved teneral may remain brown, as in some of the faded specimens in museum collections.

Maritime earwigs appear to be primarily predaceous. In the laboratory they have been observed by Fulton (1924) to catch and devour crickets, sand-fleas and smaller earwigs, using their forceps. Foraging occurs at night. In the daytime I found these earwigs under rocks, logs, driftwood and various other objects washed up along shores where there is salt or brackish water, but they quickly crawl into cracks and crevices when exposed. Because of the flexible abdomen and the strong pinching ability, they are most easily collected with forceps.

Adults and juveniles have been collected during all seasons of the year. They occur in definite colonies, and if a single individual is found, usually many (up to several dozen) can be collected in the immediate vicinity. In my experience, there was a predominance of females at all collecting sites.

Based upon seven years (1964-69, 73) of collecting in California, adult females and the larger juveniles (third, fourth and fifth instars) were found in the winter and early spring months. Depending upon the climate, availability of food, and other factors, the instars tend to overlap in size, and even the adults have considerable size variability. Some of the dwarf adults may be just slightly over half the size of the majority of individuals.

In late spring, summer and autumn, males were found in the colonies along with females and all stages of juveniles. Eggs were found in deep cracks or burrows from early summer to autumn, but are probably present at other times. The female guards her egg clutch, which is probably deposited over a period of several days. In one instance, 84 eggs were found tended by a single female. In another case, 88 eggs guarded by two females were unearthed from a chamber between rocks and dirt. Females maintain the eggs in neat piles, turn them over, and keep them free of dirt. The eggs are glistening white, nearly spherical and slightly over 1 mm in diameter when deposited. As the embryos develop, the eggs elongate to nearly 2 mm and darken.

In California, *Anisolabis maritima* is found only under very restricted ecological conditions. Most individuals have been collected near the high tide level at San Francisco Bay, San Pablo Bay and Carquinez Strait (Langston, 1967). Below this level the conditions appear to be

too wet, with the water often seeping into the depressions beneath rocks or logs. In this zone the predominant animal life consists of Isopoda (kelp sowbugs), and other Crustacea. Above the high tide level the substrate becomes increasingly drier. In this zone the predominant animal life consists of Isopoda (dooryard sowbugs, common pillbugs), with the commoner insects including silverfish, crickets, European earwigs, carabid and staphylinid beetles, and ants. Many of the areas where this earwig was found were very rocky with considerable drift and debris, but very little noticeable plant life. It is probable that *A. maritima* moves up and down from the high tide level to feed on most of the animal forms mentioned above, except probably the larger Crustacea.

Caudel (1913) stated that *A. maritima* is found only along the seashore. In California it seems to prefer bays and inlets (Langston, 1967). Although generally distributed along the Gulf and Atlantic coasts, the established colonies in California are mostly restricted (see Fig. 1), with few collections from along the open ocean coasts. Absence of many records on the immediate coast is not due to poor collecting, as two other species of earwigs, *Euborellia annulipes* (Lucas) and *Forficula auricularia* Linnaeus, have been taken abundantly. There are many records of both species either on or just above the seashore in northern, central and southern California.

The first published report on the occurrence of *A. maritima* in California was by Essig (1922), who found it at Laguna Beach and vicinity during June and July, 1921. In 1944, a single male was collected at Costa Mesa also in Orange County. It has been taken in quarantine by the California Department of Agriculture at six localities in southern California.

GEOGRAPHICAL DISTRIBUTION

Anisolabis maritima is worldwide in distribution. It has been recorded from most of the continents and major islands, with the exception of the Arctic and Antarctic regions. Specifically, it has been reported from France, Italy, along the Mediterranean (Hebard, 1917); Canary Islands, Formosa, Japan, New Zealand, Puerto Rico, Santo Domingo (Burr, 1910); and Venezuela (Rehn, 1949). Published North American records include British Columbia, Canada (Hebard, 1933; Helfer, 1963); and the Gulf and Atlantic coasts of the United States as far north as Maine (Hebard, 1917).

California distribution:—The detailed California records include the term "juv." for immature specimens, which are similar to the females until the penultimate stage. In this stage and the adults, the forceps dif-

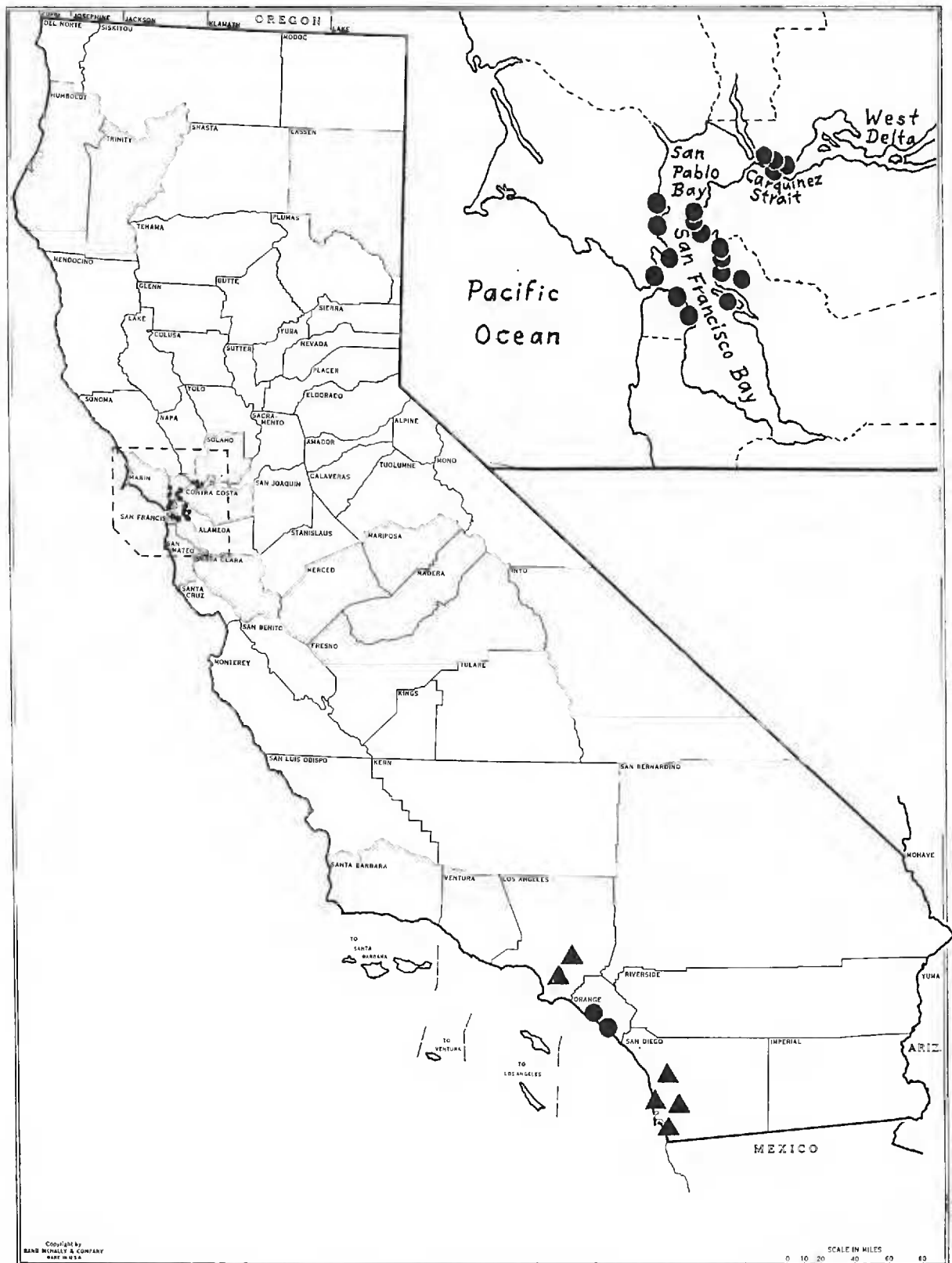


FIG. 1. California distribution of *Anisolabis maritima*. Circles denote established populations. Triangles denote quarantine records.

fer markedly between the sexes. Therefore, the specimens are not sexed in the detailed collection records unless close to, or in the adult stage.

Established records of specimens are believed to represent naturalized populations. These include localities where large numbers were taken

or small numbers were accumulated over a period of years. A single record may be considered established if it is within the over-all distribution where there are adjacent or contiguous records. *Quarantine* records indicate specimens taken at border or ports-of-entry stations by the California Department of Agriculture. Quarantine also includes the within-state or county records where specimens were intercepted. These border and within-state records usually show the point-of-origin, and/or the host material.

The following initials refer to the institutions where specimens are on deposit: BVC = Bureau of Vector Control, California Public Health Service, Berkeley; CAS = California Academy of Sciences, San Francisco; CDA = California Department of Agriculture, Sacramento; CIS = California Insect Survey, University of California, Berkeley; CSH = California State University at Hayward; LACM = Los Angeles County Museum of Natural History, Los Angeles; SFS = San Francisco State University, San Francisco; UCD = University of California, Davis; and UCR = University of California, Riverside.

ALAMEDA COUNTY: Alameda, 1 juv., No date or collector (CDA); Albany, 2 ♀ ♀, X-17-1965 (R. L. Langston—CIS); Berkeley, 6 ♂ ♂, 24 ♀ ♀, XII-16-1949, 40 ♀ ♀, XII-24-1949, shore of S. F. Bay (J. W. MacSwain—CIS); Emeryville, 2 ♂ ♂, 20 ♀ ♀, 20 juv., X-17-1965, 4 ♀ ♀, 4 juv., I-15-1966, mud flats (R. L. L.—CAS, CDA, CIS, LACM, UCD, UCR); Oakland, VII-17-1957 (N. L. Jones—CDA). CONTRA COSTA COUNTY: Point Molate, Richmond, 1 ♂, 4 ♀ ♀, III-23-1962 (A. G. Raske—CIS), 12 ♀ ♀, 19 juv., II-13-1966, 24 ♂ ♂, 26 ♀ ♀, V-19-1966, shore of S. F. Bay (R. L. Langston—CAS, CDA, CIS, CSH, LACM, SFS, UCD, UCR), 23 ♂ ♂, 41 ♀ ♀, 20 juv., III-26-1966 (R. L. L. & P. A. Opler—CAS, CIS); Point Richmond, 4 ♂ ♂, 12 ♀ ♀, 8 juv., V-19-1966, 2 ♂ ♂, 10 ♀ ♀, 6 juv., V-6-1967, shore of S. F. Bay (R. L. L.—CIS, LACM); Pinole Point, 3 ♂ ♂, 12 ♀ ♀, 6 juv., IX-29-1973 (R. L. L.—BVC, CAS); Point San Pablo, Richmond, 2 ♂ ♂, 8 ♀ ♀, IX-16-1967, 11 ♂ ♂, 8 ♀ ♀, III-9-1968, 15 ♂ ♂, 25 ♀ ♀, 20 juv., IX-21-1973, shore of San Pablo Bay (R. L. L.—BVC, CAS, LACM); Port Costa, 1 mi. W., 2 ♂ ♂, 15 ♀ ♀, V-30-1964, 7 ♀ ♀, VI-27-1964, 1 ♂, I-17-1965, 8 ♀ ♀, 8 juv., II-27-1966, shore of Carquinez Strait (R. L. L.—CAS, CDA, CIS, LACM, UCD, UCR). LOS ANGELES COUNTY: Los Angeles, IV-10-1940, Quarantine from San Francisco on dahlias (CDA); San Gabriel, III-3-1941, Taken in quarantine on chrysanthemum (CDA). MARIN COUNTY: Belvedere, 1 ♀, V-13-1947 (E. Tams—CDA); China Camp, 2 ♀ ♀, XI-7-1965, shore of San Pablo Bay (R. L. Langston—CIS); Near Peacock Gap, San Rafael, 3 ♂ ♂, 5 ♀ ♀, 3 juv., XI-7-1965, 6 ♂ ♂, 20 ♀ ♀, 84 eggs, VI-2-1966 (R. L. L.—CAS, CDA, CIS, LACM, SFS, UCR); Sausalito, 1 ♂, 14 ♀ ♀, 10 juv., XI-7-1965, shore of S. F. Bay (R. L. L.—CAS, CIS, LACM, UCR). ORANGE COUNTY: Costa Mesa, 1 ♂, III-6-1944, ex firewood (R. G. Bumgardner—CDA); Laguna Beach and vicinity, VI & VII-1921 (Essig, 1922—first California record). SAN DIEGO COUNTY: Chula Vista, I-18-1933, ex lawn (CDA); Del Mar, III-9-1932, Quarantine on *Araucaria* sp. (J. Adams—CDA); El Cajon, IV-10-1940, Quarantine from San Francisco on dahlia tubers (CDA); Escondido, VI-29-1934,

Quarantine from OREGON (M. England—CDA). SAN FRANCISCO COUNTY: "Frisco Bay, Cal." 1 ♂, 4 ♀♀, XII-10-1949, under rock ("W. V. G."—CIS); San Francisco, 1 ♂, IX-1935 (E. S. Ross—CAS). SOLANO COUNTY: Benecia, 5 ♂♂, 12 ♀♀, VI-2-1966 (R. L. Langston—CAS, CIS); Benecia, 1 mi. W., 7 ♂♂, 13 ♀♀, 8 juv., 88 eggs, VI-2-1966, 13 ♂♂, 32 ♀♀, 27 juv., X-16-1966, shore of Carquinez Strait (R. L. L.—CAS, CIS, CSH, SFS); Glen Cove, 1 ♂, 1 ♀, VI-2-1966, 1 ♂, 4 ♀♀, VI-11-1967, 1 ♂, 4 ♀♀, VI-15-1969, shore of Carquinez Strait (R. L. L.—BVC, CIS, LACM).

Limited searches with negative results were made on parts of the immediate coast within the boundaries of the inset in Fig. 1. It is possible that severe wave action excludes the earwig from the Pacific Ocean seashore, in the western part of this area. It appears to be absent along the northern periphery of San Pablo Bay (Black Point, Vallejo, mouths of the Napa and Petaluma Rivers), possibly because the water is too fresh from the river outflows. It may also be absent from the west delta area east of Benecia or Port Costa (Martinez, Port Chicago, Antioch, Bethel Island, Brannan Island, Rio Vista) because the water may be too fresh, although seasonal increases in salinity occur depending on the tides and time of year. No examples were taken south of Alameda or San Francisco. Perhaps the water is too salty or polluted. However, two other earwigs (*Euborellia annulipes* and *Forficula auricularia*) occur abundantly around the South Bay.

ACKNOWLEDGMENTS

The help of Mr. George Buxton, California Department of Agriculture, Sacramento is greatly appreciated. Complete freedom in the use of his files, examination of specimens, and prompt notification of new records as they appeared in quarantine were especially helpful. Thanks are extended to Dr. J. A. Powell of the California Insect Survey, Berkeley, for revisions and suggestions in relation to a more complete manuscript on the Dermaptera, from which much of the data for this paper was extracted. I gratefully acknowledge the cooperation of Dr. P. H. Arnaud, Jr., for the study of the collection at the California Academy of Sciences, San Francisco, which is particularly rich in specimens from many parts of the world.

LITERATURE CITED

- BURR, M. 1910. The Dermaptera (earwigs) of the United States National Museum. Proc. U.S. Nat. Mus., 38: 443-467.
- CAUDELL, A. N. 1913. Notes on Nearctic orthopterous insects. I. Nonsaltatorial forms. Proc. U.S. Nat. Mus., 44: 595-614.

- ESSIG, E. O. 1922. Insect notes from Laguna Beach, California. Pomona College J. of Entomol. & Zool., 14: 75-78.
- FULTON, B. B. 1924. Some habits of earwigs. Ann. Entomol. Soc. Amer., 17: 357-367.
- HEBARD, M. 1917. Notes on the earwigs (Dermaptera) of North America, north of the Mexican boundary. Entomol. News, 28: 311-323.
- HEBARD, M. 1933. Dermaptera in collection of the California Academy of Science. Pan-Pac. Entomol., 9: 140-144.
- HELPER, J. R. 1963. How to know the grasshoppers, cockroaches and their allies. Pictured-key Nature Series. Wm. C. Brown Co., Dubuque, Iowa. v + 354 pp.
- LANGSTON, R. L. 1967. The maritime earwig, *Anisolabis maritima* (Géné). Pan-Pac. Entomol., 43: 88.
- POPHAM, E. J. 1965. A key to dermapteran subfamilies. The Entomologist, June, 1965: 126-136.
- REHN, J. W. H. 1949. Catalogue of the Dermaptera of Venezuela. Bol. Entomol. Venezolana, 8: 1-9.
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RECENT LITERATURE

THE BUTTERFLIES OF SOUTHERN CALIFORNIA. Thomas C. Emmel and John F. Emmel. Natural History Museum of Los Angeles, Science Series, 26, 148 pp. 1973. \$4.00.

Amid the plethora of regional natural history manuals published recently this volume is distinguished by its uniform professional quality, combined with a popular, easily read style. The introductory discussion includes a concise review of the seasonal and geographic distribution of southern California butterflies in terms of Merriam life zones. Brief but extremely interesting historical sketches of the more important lepidopterists of the area are followed by informative accounts of the species, including summaries of distributions and larval food plants and short descriptions of immature stages. The color plates of adults are excellently reproduced, and many larvae and pupae are illustrated in text figures. The host plant index and a pertinent list of references are useful features not always found in such faunal treatments.—EDITOR.